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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/580,196

01/24/2007

Volker Gallatz

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WASHINGTON,, DC 20036

EXAMINER

COLEMAN, KEITH A

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/580,196	<b>Applicant(s)</b> GALLATZ ET AL.	
	<b>Examiner</b> KEITH COLEMAN	<b>Art Unit</b> 3747	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 15-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-24 and 35 is/are allowed.
- 6) ☒ Claim(s) 25-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ward (US Patent No. 4,138,890).

With regards to claim 25, the patent to Ward discloses a microwave source (10, Col. 4, Lines 52, Figure 1) located outside of the combustion space (i.e. interior of chamber 22, See Figure 1) and producing spaced microwave pulses; and a microwave window (i.e. spark plug 20) connected to said microwave source (10) except positively disclosing through which the microwave pulses are injected in and uniformly throughout the combustion space of the engine to be absorbed by fuel uniformly in all of the combustion space with temperature of the fuel being increased uniformly by the microwave pulses when absorbed by the fuel due to energy delivery, without forming of plasma by selection of a time interval for injecting the microwave pulses, of power of the microwave pulses, of pulse duration and of pulse spacing, up to an ignition temperature.

Since Ward explicitly states on Col. 3, Lines 37-45 that "For combustion chambers of arbitrary shape or changing shape, one can optimize coupling of the microwave energy by operating at frequencies with corresponding wavelengths smaller than the chamber dimensions. In this way microwave energy can be radiated out to the flame, and also one or more standing waves, or cavity modes, can be set up which permits the maintenance of continuous high electric fields.", it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the engine of Ward with wherein the microwaves are uniformly distributed in the entire combustion space in order to maintain an equilibrium (Col. 3, Line 46 from Ward)

As to the newly added amendments, Applicant is reminded to see MPEP 2114 regarding functional language.

With regards to claim 26, the patent to Ward discloses wherein the microwave window (20) is mounted on an engine at a combustion chamber thereof.

With regards to claim 27, the patent to Ward discloses wherein said microwave source (10) is connected to an electric power supply source to deliver electrical pulses to said microwave source converted to the spaced microwave pulses by said microwave source (10).

With regards to claim 28, the patent to Ward discloses wherein a coupling between said microwave source (10) and said microwave window (22) transmits the microwave pulses sent from said microwave source to said microwave window (22), but avoids transmitting microwaves reflected by the combustion space back into said microwave source.

With regards to claim 29, the patent to Ward discloses wherein said coupler (24a) is connected to said microwave source (10) and said microwave window (22) by microwave lines.

With regards to claim 30, the patent to Ward discloses wherein said coupler comprises first, second and third ports connected to said microwave source (10), said

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microwave window (22) and a passive microwave consumer (16,24a to 28a), respectively.

5. Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ward (US Patent No. 4,138,890) in view of Ward (US Patent No. 4,297,983).

With regards to claims 31 and 32, the patent to Ward (890) discloses all the limitations of the claimed subject matter except positively disclosing wherein said microwave window comprises ceramic material.

The patent to Ward (983) discloses wherein said microwave window comprises ceramic material (Col. 10, Lines 15-20, See Figure 9).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide the microwave window of Ward (890) with wherein said microwave window comprises ceramic material in view of the teaching to Ward (983), in order to lower the resonant frequency (Col. 10, Lines 20-24) and because the modification is invariably a change in material. See MPEP 2144.07. *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) (selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious);

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ward (US Patent No. 4,138,980) in view of Ward (US Patent No. 4,297,983) as applied to claim 11 above, and further in view of Nichol (US Patent No. 2,563,952)

With regards to claim 33, the combination of Ward (US Patent No. 4,138,980) and Ward (US Patent No. 4,297,983) discloses all the limitations of the claimed subject matter including Ward disclosure of wherein the microwave source (10) is connected to the microwave window (i.e. spark plug 20, See Claim 10) by a microwave line (18a), except positively disclosing by a flexible microwave line.

Nichol discloses a flexible microwave line (19, See Figure 2).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to substitute the cable of the combination of Ward (US Patent No. 4,138,980) and Ward (US Patent No. 4,297,983) with flexible microwave line in view of the teaching to Nichol, in order to dampen and suppress oscillations commonly generated in an ignition system (Col. 1, Lines 5-10)

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ward (US Patent No. 4,138,980), Nichol (US Patent No. 2,563,952) in view of Ward (US Patent No. 4,297,983) as applied to claims above, and further in view of Ward (US Patent No. 3,934,566, Provided by Applicant)

With regards to claim 34, the combination of Ward (US Patent No. 4,138,980), Ward (US Patent No. 4,297,983), and Nichol (US Patent No. 2,563,952) discloses all the limitations of the claimed subject matter including Ward disclosure of wherein a fuel-air mixture is ignited in the combustion space (i.e. interior of chamber 22) except positively disclosing wherein the engine is a diesel engine.

The patent to Ward (US Patent No. 3,934,566) discloses wherein the engine a diesel (See Col. 10, Lines 40-46) engine.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to substitute the engine of the combination of Ward (US Patent No. 4,138,980), Ward (US Patent No. 4,297,983), and Nichol (US Patent No. 2,563,952) with diesel engine in view of the teaching to Ward (US Patent No. 3,934,566), in order to increase efficiency and/or decrease exhaust emissions of an internal combustion engine (Col. 1, Lines 5-10 from Ward (US Patent No. 3,934,566)).

### ***Allowable Subject Matter***

1. Claims 15-24 and 35 are allowed.

### ***Conclusion***

2. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cesa (US Patent No. 7,201,882).



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Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEITH COLEMAN whose telephone number is (571)270-3516. The examiner can normally be reached on 5:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Cronin can be reached on (571)272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KAC  
/K. C./  
Examiner, Art Unit 3747

/Stephen K. Cronin/  
Supervisory Patent Examiner, Art Unit 3747